

REMARKS

In the Office Action of January 10, 2003 in the above-identified application, Claims 6, 7, 9, 11 - 16 were rejected. No claim was allowed.

In response, Claims 9 and 13 are amended and new Claims 17 - 20 are added to the application. Reexamination and reconsideration are respectfully requested in view of the following remarks.

Rejection of Claims 9 and 11 - 16 under 35 U.S.C. §102(b) over de Baan

Claims 9 and 11 - 16 were rejected under 35 U.S.C. §102(b) as being anticipated by de Baan (GB 2330157A). The Examiner alleges that regarding Claim 9, de Baan discloses a flexible riser part seen as a second conduit connected to a point below the surface and a rigid riser part seen as first conduit connected to the flexible riser part and to the floating support. The Examiner further alleges that the first conduit appears to have a length equal to half the water depth and that the drawing shows how the conduit flexes as shown by the bending in shape of the line. The Examiner further alleges that the riser system is used to convey fluids between a seabed installation such as an oil well and a floating production vessel on the sea surface. Regarding Claim 11, the Examiner alleges that de Baan discloses a catenary anchor system. Regarding Claim 12, the Examiner alleges that the reference shows that buoyancy members provide additional tension in the tube. Regarding Claims 13 - 16, the Examiner alleges that the method of forming the device is not germane to the issue of the patentability of the device itself.

This rejection is respectfully traversed as it may be applied to Claim 9 and 11 - 16 and to new Claims 17 - 20. The de Baan reference discloses a riser 2 consisting

of a first section 13 and a second section 14 connected by an articulated joint 7. Contrary to what is asserted by the Examiner, there is absolutely no teaching or suggestion in de Baan that an upper section of a pipe is a rigid riser part and a lower section of a pipe is a flexible riser part, as in the present invention. Rather, the reference makes statements such as that on page 6, lines 32 to 35 to the effect that that both the upper section and the lower section 13, 14 may be of a double skinned type, clearly implying that the upper section and the lower section are made of the same material. Nothing in Baan teaches or suggests that the upper section and the lower section differ in features, structure or characteristics. The reason why the upper section looks rigid in Figure 3a and 3b is that the upper section is anchored to the bottom at one end, and is upheld by a buoyancy member on the other end, so that the upper section is straightened out. But nothing in these figures or the discussion of these figures in the text of the reference teaches or suggests that the upper section is of a different material than the lower section or that the upper section is a rigid riser. Further, there would be no motivation to alter the structure of the riser of de Baan to provide a rigid riser part and a flexible riser part, since de Baan does not recognize the problem of weight of a flexible riser and the problem of tacking up the motions of the floating support by the rigid riser, a problem that is addressed by the present invention. Accordingly, independent Claims 9 and 11 are not obvious over de Baan

Moreover, regarding Claims 13 - 16 and the Examiner's assertion that the method of forming the device is not germane to the issue of the patentability of the device itself, the Examiner is requested to note that these claims are method claims. Therefore the method of forming the device is germane to the issue of patentability

of the claimed method. Claim 13 is amended herein as an independent claim.

Consideration of Claims 13 - 16 on the merits as method claims is respectfully requested.

Accordingly, it is respectfully submitted that Claims 9 and 11 - 16, along with dependent Claims 6 and 7, which were not discussed in the Office Action, and new Claims 17 - 20 submitted herewith, are not anticipated by, nor would they have been obvious over, de Baan.

Rejection of Claims 9 and 11 - 16 under 35 U.S.C. §103(a) over Remery

Claims 9 and 11 - 16 were rejected under 35 U.S.C. §103(a) over Remery (U.S. Patent No. 4,279,543). The Examiner alleges that Remery discloses a flexible riser part seen as a flexible tube connected to a point below the surface and a rigid riser part seen as pipe connected to the flexible riser part and to the floating support. The Examiner further alleges that the pipe appears to have a length equal to half the water depth. The Examiner acknowledges that Remery does not teach an injection pipe, but alleges that it would have been obvious to reverse the flow of the medium flow. Regarding Claim 11, the Examiner alleges that Remery discloses a catenary anchor system seen as a weight next to the universal joint. Regarding Claim 12, the Examiner alleges that the Remery discloses a buoyant body to provide addition tension in the tube. Regarding Claims 13 - 16, the Examiner alleges that the method of forming the device is not germane to the issue of the patentability of the device itself.

This rejection is respectfully traversed. Claim 9 is amended to provide that the pipe further includes a catenary anchor system applied to the rigid riser part in the

vicinity of the junction or a connector between the flexible riser part and the rigid riser part. This feature is already contained in Claim 11 and is included in new Claim 17. Remery relates to a device for conveying a medium comprising a buoy, a pipe fastened to the buoy, a flexible tube connected to the lower end of the pipe at one end and to a fixed position on the bottom at the other end. However, Remery does not teach or suggest that the lower end of the pipe is anchored by a catenary anchor system. Moreover, the aim of the device of Remery is to avoid that the tube may be bent and/or twisted and be loaded with additional tractive force (Col. 1, lines 22 - 23). The requirement of the present invention that the lower end of the rigid part be anchored to the sea bed is not compatible with this aim, since the anchoring means will create stresses by limiting the moving of the lower end of the rigid part. Therefore, a person skilled in the art would be dissuaded from modifying the device of Remery by anchoring the lower part of the pipe. Accordingly, independent Claims 9 and 11 are not obvious over Remery.

Moreover, regarding Claims 13 - 16 and the Examiner's assertion that the method of forming the device is not germane to the issue of the patentability of the device itself, the Examiner is requested to note that these claims are method claims. Therefore the method of forming the device is germane to the issue of patentability of the claimed method. Claim 13 is amended herein as an independent claim. Consideration of Claims 13 - 16 on the merits as method claims is respectfully requested.

Accordingly, it is respectfully submitted that Claims 9 and 11 - 16, along with Claims 6 and 7, which were not discussed in the Office Action, and new Claims 17 - 20 submitted herewith, would not have been obvious over Remery.

Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that Claims 6 – 7, 9, and 11 - 16 and new claims 17 - 20 are allowable. Favorable reconsideration is respectfully requested.

Should the Examiner believe that anything further is necessary to place this application in condition for allowance, the Examiner is requested to contact applicants' undersigned attorney at the telephone number listed below.

Kindly charge any additional fees due, or credit overpayment of fees, to Deposit Account No. 01-2135 (Case No. 612.37981CX1).

Respectfully submitted,
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Marked up copy to show changes made:

IN THE CLAIMS

9) (four times amended) A pipe for great water depths allowing transfer of a fluid between a floating support and a point located below and at a distance from the water surface, characterized in that it comprises:

a continuously flexible riser part connected, at one end, to the point located below the surface, and

a rigid riser part connected to the flexible riser part at one end and to the floating support at the second end thereof,

said rigid riser part having a length at least equal to half the water depth, and further including a catenary anchor system applied to the rigid riser part in the vicinity of the junction or a connector between the flexible riser part and the rigid riser part,

wherein the pipe is an injection pipe or line and characterized in that the rigid riser part is connected to a source of fluid to be injected and the flexible riser part is connected to a point where the fluid is to be injected.

13) (twice amended) A method of designing a pipe ~~in a system as claimed in Claim 11, for great water depths allowing transfer of a fluid between a floating support and a point located below and at a distance from the water surface, the pipe comprising at least one flexible riser part connected, at one end, to the point located below the surface, and at least one rigid riser part connected to the flexible riser part at one end and to the floating support at the second end thereof, said rigid riser part having~~

a length at least equal to half the water depth, and a catenary anchor system applied to the rigid riser part in the vicinity of the junction or a connector between the flexible riser part and the rigid riser part and for use in a body of water that exerts stresses on the pipe and the floating support due to wave motion, current and wind, the stresses thereby causing motions in the pipe and/or the floating support, and wherein the flexible riser part will have a definable internal pressure resulting from the conveying of the particular fluid, a definable external pressure resulting from the water depth, a definable maximum traction resulting from stresses from the body of water, and a definable maximum allowable curvature, resulting from the composition of the flexible riser part, and wherein the rigid riser part has a defined holding means wherein it can be connected inside or on an edge of the floating member without coming into contact with the floating member, and wherein the rigid riser part has a defined diameter, and wherein the rigid riser part is subject to stresses generated by the weight of the pipe, the suspended weight of the flexible part, hydrodynamic strains, strains induced by displacements of the floating support, inside pressures and outside pressures,

the method comprising the steps of

- A) defining the flexible riser part by the steps of
 - a) determining extreme motions that the floating support would be subjected to in the body of water and assuming that extreme motions at an end of the flexible riser part where it is connected to the rigid riser part are substantially identical to the extreme motions of the floating support, and
 - b) selecting a point (Ph) along a vertical axis that coaxial to the axis that the rigid riser part will have when the rigid riser part is connected to the floating support,

wherein the first point (Ph) is closer to the bottom of the body of water than to the top of the body of water and determining whether the point (Ph) can serve as the location where the flexible riser part is connected to the rigid riser part, the determining taking into account the extreme motions that the end of the flexible riser part where it is connected to the rigid riser part would be subjected to, as determined by step (a), and further taking into account the inside pressure, the exterior pressure, the nature of the fluid, the maximum traction of the flexible riser part and the maximum allowable curvature, wherein, if point (Ph) cannot serve as the location where the flexible riser part is connected to the rigid riser part, the step (b) is repeated with one or more additional points, until a point is found that can serve as the location where the flexible riser part is connected to the rigid riser part,

B) defining the rigid riser part by the steps of

- a) selecting the length of the rigid riser part so that the length is substantially equal to the value of a distance, under equilibrium conditions, between the upper end of the flexible riser and the holding means, so that length of the rigid riser part is at least equal to half the depth of the water depth,
- b) selecting the thickness of the rigid riser part by taking into account stresses generated by the weight of the pipe, the suspended weight of the flexible riser part, hydrodynamic strains, strains induced by displacements of the floating support, inside pressures and outside pressures, and
- c) checking that the rigid riser part when the rigid riser part is connected by the holding means inside or on an edge of the floating support, the rigid riser part does not come into contact with the floating support, and wherein if the rigid riser part

does contact the floating support, steps A) and B) are repeated with different values for the point (Ph).

Clean copy of all pending claims

6) (Previously amended three times) The system of Claim 11, wherein at least one of said one or more risers further comprises heat insulation means placed on at least the rigid riser part and/or the flexible riser part.

7) (Previously amended three times) The system of Claim 11 wherein at least one of said one or more risers is characterized in that said rigid riser part is held up to the floating support by holding means (9) allowing said pipe to be tensioned under the effect of its own weight.

9) (Previously amended three times and amended herein) A pipe for great water depths allowing transfer of a fluid between a floating support and a point located below and at a distance from the water surface, characterized in that it comprises:

 a continuously flexible riser part connected, at one end, to the point located below the surface, and

 a rigid riser part connected to the flexible riser part at one end and to the floating support at the second end thereof,

 said rigid riser part having a length at least equal to half the water depth, and
 further including a catenary anchor system applied to the rigid riser part in the vicinity of the junction or a connector between the flexible riser part and the rigid riser part,

wherein the pipe is an injection pipe or line and characterized in that the rigid riser part is connected to a source of fluid to be injected and the flexible riser part is connected to a point where the fluid is to be injected.

11) (Previously amended three times) A system for producing petroleum effluents in great water depths allowing fluid transfer between a floating support and a source of effluents, characterized in that the system comprises at least one or more risers and/or one or more injection lines, and wherein each of the one or more risers and/or one or more injection lines is a pipe for great water depths (D) allowing transfer of a fluid between a floating support (1) and a point located below and at a distance from the water surface, characterized in that it comprises:

a continuously flexible riser part (7) connected, at one end, to the point located below the surface, and

a rigid riser part (6) connected to the flexible riser part at one end and to the floating support at the second end thereof,

said rigid riser part (6) having a length at least equal to half the water depth,

further comprising a catenary anchor system (10) applied to the rigid riser part in the vicinity of the junction and/or of connector (8) between flexible riser part (7) and rigid riser part (6).

12) (Twice amended) The system of Claim 11, further comprising additional means for tensioning the riser(s).

13) (Amended once previously and amended herein) A method of designing a pipe for great water depths allowing transfer of a fluid between a floating support and a point located below and at a distance from the water surface, the pipe comprising at least one flexible riser part connected, at one end, to the point located below the surface, and at least one rigid riser part connected to the flexible riser part at one end and to the floating support at the second end thereof, said rigid riser part having a length at least equal to half the water depth, and a catenary anchor system applied to the rigid riser part in the vicinity of the junction or a connector between the flexible riser part and the rigid riser part and for use in a body of water that exerts stresses on the pipe and the floating support due to wave motion, current and wind, the stresses thereby causing motions in the pipe and/or the floating support, and wherein the flexible riser part will have a definable internal pressure resulting from the conveying of the particular fluid, a definable external pressure resulting from the water depth, a definable maximum traction resulting from stresses from the body of water, and a definable maximum allowable curvature, resulting from the composition of the flexible riser part, and wherein the rigid riser part has a defined holding means wherein it can be connected inside or on an edge of the floating member without coming into contact with the floating member, and wherein the rigid riser part has a defined diameter, and wherein the rigid riser part is subject to stresses generated by the weight of the pipe, the suspended weight of the flexible part, hydrodynamic strains, strains induced by displacements of the floating support, inside pressures and outside pressures,

the method comprising the steps of

A) defining the flexible riser part by the steps of

a) determining extreme motions that the floating support would be subjected to in the body of water and assuming that extreme motions at an end of the flexible riser part where it is connected to the rigid riser part are substantially identical to the extreme motions of the floating support, and

b) selecting a point (Ph) along a vertical axis that coaxial to the axis that the rigid riser part will have when the rigid riser part is connected to the floating support, wherein the first point (Ph) is closer to the bottom of the body of water than to the top of the body of water and determining whether the point (Ph) can serve as the location where the flexible riser part is connected to the rigid riser part, the determining taking into account the extreme motions that the end of the flexible riser part where it is connected to the rigid riser part would be subjected to, as determined by step (a), and further taking into account the inside pressure, the exterior pressure, the nature of the fluid, the maximum traction of the flexible riser part and the maximum allowable curvature, wherein, if point (Ph) cannot serve as the location where the flexible riser part is connected to the rigid riser part, the step (b) is repeated with one or more additional points, until a point is found that can serve as the location where the flexible riser part is connected to the rigid riser part,

B) defining the rigid riser part by the steps of

a) selecting the length of the rigid riser part so that the length is substantially equal to the value of a distance, under equilibrium conditions, between the upper end of the flexible riser and the holding means, so that length of the rigid riser part is at least equal to half the depth of the water depth,

b) selecting the thickness of the rigid riser part by taking into account stresses generated by the weight of the pipe, the suspended weight of the flexible riser part,

hydrodynamic strains, strains induced by displacements of the floating support, inside pressures and outside pressures, and

c) checking that the rigid riser part when the rigid riser part is connected by the holding means inside or on an edge of the floating support, the rigid riser part does not come into contact with the floating support, and wherein if the rigid riser part does contact the floating support, steps A) and B) are repeated with different values for the point (Ph).

14) (Previously added) The method of claim 13, wherein steps A) and B) of defining of the flexible riser part and the rigid riser part are carried out under static conditions.

15) (Previously added) The method of claim 14, wherein the outcome of steps A) and B) of defining of the flexible riser part and the rigid riser part under static conditions is checked by means of dynamic dimensioning stages.

16) (Previously added) The method of claim 13, wherein steps A) and B) of defining of the flexible riser part and the rigid riser part are carried out under dynamic conditions.

17) (new) A pipe for great water depths allowing transfer of a fluid between a floating support and a point located below and at a distance from the water surface, characterized in that it comprises:

at least one flexible riser part connected, at one end, to the point located below the surface, and

at least one rigid riser part connected to the flexible riser part at one end and to the floating support at the second end thereof,

 said rigid riser part having a length at least equal to half the water depth, and a catenary anchor system applied to the rigid riser part in the vicinity of the junction or a connector between the flexible riser part and the rigid riser part.

18) (New) The pipe of Claim 17, wherein said pipe further comprises heat insulation means placed on at least the rigid riser part and/or the flexible riser part.

19) (New) The pipe of Claim 17 wherein said pipe is characterized in that said rigid riser part is held up to the floating support by holding means allowing said pipe to be tensioned under the effect of its own weight.

20) (New) The pipe of Claim 17 wherein the pipe is an injection pipe or line and wherein the rigid riser part is connected to a source of fluid to be injected and the flexible riser part is connected to a point where the fluid is to be injected.